Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1.–4. (Canceled)

5. (Currently Amended) A method of detecting and recovering a failure in a protected single-fiber passive optical network, wherein the protected single-fiber passive optical network comprises a first interface including a first transmitter and a first receiver, a second interface including a second transmitter and a second receiver, an optical fiber connecting the first and second interfaces, a plurality of passive nodes between the first and second interfaces, and a plurality of optical network units connected to the plurality of passive nodes, the method comprising:

sending optical signals from the first interface via the optical fiber to the second interface;

detecting at the second interface a degradation in power level of the optical signals from the first interface;

synchronizing at least some of the plurality of optical network units with the second interface;

measuring round trip delays between the second interface and optical network units attached to the second interface; and

in response to said detecting, switching on the second transmitter of the second interface.

6. (Previously Presented) The method according to Claim 5, wherein switching on the second transmitter of the second interface occurs if the power level of the optical signals drops below a predetermined threshold value.

7. (Previously Presented) The method according to Claim 6, further comprising switching off the second transmitter if the power level increases above the predetermined threshold value.

8. (Previously Presented) The method according to Claim 6, further comprising keeping the second transmitter switched on if the power level increases above the predetermined threshold value.

9. (Previously Presented) The method according to Claim 8, further comprising switching the second transmitter off and on again to verify whether a degradation in power level of the optical signals from the first interface is still detected.

10. (Previously Presented) The method according to Claim 6, further comprising switching off the second transmitter if an abrupt change in the power level is detected after switching on the second transmitter.

11. (Previously Presented) The method according to Claim 10, further comprising switching on the second transmitter again if the power level decreases below the predetermined threshold value.

12. (Previously Presented) A method of detecting and recovering a failure in a protected single-fiber passive optical network, wherein the protected single-fiber passive optical network comprises a first interface including a first transmitter and a first receiver, a second interface including a second transmitter and a second receiver, an optical fiber connecting the first and second interfaces, a plurality of passive nodes between the first and second interfaces, and a plurality of optical network units connected to the plurality of passive nodes, the method comprising:

sending optical signals from the first interface via the optical fiber to the second interface;

detecting at the second interface a degradation in a power level of the optical signals from the first interface; and

in response to said detecting a degradation in the power level, switching on the second transmitter of the second interface;

wherein after said detecting the degradation in the power level, and if the first and second interfaces are located in a single optical line terminal, the method further comprises:

starting, in the second interface, an auto-discovery process to register affected optical network units;

in response to a result of the auto-discovery process, updating an internal routing table of the optical line terminal; and

sending affected downstream traffic of the affected optical network units using the second interface.

13. (Withdrawn) The method according to Claim 5, wherein after detecting the degradation in the power level, and wherein if the first and second interfaces are located in different optical line terminals, the method further comprises:

starting, in the second interface, an auto-discovery process to register affected optical network units;

establishing a dedicated path between the first and second interfaces;

sending a notifying message from the second interface to the first interface, wherein the notifying message comprises information about the affected optical network units;

forwarding downstream traffic of the affected optical network units from the first interface to the second interface via the dedicated path; and

forwarding affected upstream traffic from the affected optical network units from the second interface to the first interface via the dedicated path.

14. (Withdrawn) The method according to Claim 13, further comprising sending, from the first interface to the second interface via the dedicated path, and indication of which higher layer addresses are behind the affected optical network units.

15. (Withdrawn) The method according to Claim 14, wherein when receiving an upstream packet via the second interface, the method further comprises:

checking whether a destination address of the upstream packet is found in a routing table of an optical line terminal associated with the second interface;

sending the upstream packet according to the routing table, and if the destination address is not found in the routing table if the destination address is found in the routing table;

and

sending the upstream packet from the second interface to the first interface via the dedicated path if the destination address is not found in the routing table.

16. (Previously Presented) A method of detecting and recovering from a failure in a protected single-fiber passive optical network, wherein the protected single-fiber passive optical network comprises a first interface including a first transmitter and a first receiver, a second interface including a second transmitter and a second receiver, an optical fiber connecting the first and second interfaces, a plurality of passive nodes between the first and second interfaces, and a plurality of optical network units connected to the plurality of passive nodes, the method comprising:

detecting in the first interface that signals are not received from at least one optical network unit;

in response to said detecting, switching on the second interface; and

starting an auto-discovery process to register the at least one optical network unit.

17. (Previously Presented) The method according to Claim 16, further comprising switching off the second transmitter of the second interface if the first interface detects that a number of optical network units from which signals are not received increases.

18. (Previously Presented) A method of detecting and recovering from a failure in a protected single-fiber passive optical network, wherein the protected single-fiber passive optical network comprises a first interface including a first transmitter and a first receiver, a second interface including a second transmitter and a second receiver, an optical fiber connecting the first and second interfaces, a plurality of passive nodes between the first and second interfaces, a plurality of optical network units connected to the plurality of passive nodes, the method comprising:

detecting, in the first interface, that signals are not received from at least one optical network unit; and

in response to said detecting, switching on the second interface;

switching off the second transmitter of the second interface if the first interface detects that a number of optical network units from which signals are not received increases;

wherein if the first and second interfaces are located in a single optical line terminal, the method further comprises:

starting, at the second interface, an auto-discovery process to register affected optical network units;

in response to a result of the auto-discovery process, updating an internal routing table of the optical line terminal; and

sending affected downstream traffic of the affected optical network units using the second interface.

19. (Withdrawn) The method according to Claim 16, wherein if the first and second interfaces are located in different optical line terminals, the method further comprises:

establishing a dedicated path between the first and second interfaces;

sending from the first interface to the second interface a message to switch on the second transmitter of the second interface;

sending a notifying message from the second interface to the first interface, wherein the notifying message comprises information about the affected optical network units;

forwarding affected downstream traffic of the affected optical network units from the first interface to the second interface via the dedicated path; and

forwarding upstream traffic from the affected optical network units from the second interface to the first interface via the dedicated path;

wherein the auto-discovery process is started at the second interface and is configured to register affected optical network units.

20. (Withdrawn) The method according to Claim 19, wherein the method further comprises sending, from the first interface to the second interface via the dedicated path, and indication of which higher layer addresses are behind the affected optical network units.

21. (Withdrawn) The method according to Claim 20, wherein when receiving an upstream packet via the second interface, the method further comprises:

checking whether a destination address of the upstream packet is found in a routing table of an optical line terminal associated with said second interface;

if the destination address is found in the routing table, sending the upstream packet according to the routing table; and

if the destination address is not found in the routing table, sending the upstream packet from the second interface to the first interface via the dedicated path.

22. (Previously Presented) A protected single-fiber passive optical network, comprising:

a first interface including a first transmitter and a first receiver;

a second interface including a second transmitter and a second receiver;

an optical fiber connecting the first and second interfaces;

a plurality of passive nodes between the first and second interfaces;

a plurality of optical network units connected to the plurality of passive nodes; and

a detector at the second interface for detecting a degradation in power level of optical signals received from the first interface via the optical fiber;

wherein the second interface is configured to start an auto-discovery process to register affected optical network units; and

wherein, in response to said detecting, the second interface is further configured to switch on the second transmitter.

23. (Previously Presented) The protected single-fiber passive optical network according to Claim 22, wherein the second interface is configured to switch on the second transmitter of the second interface when the optical power level of optical signals received with the second receiver drops below a predetermined threshold value.

24. (Previously Presented) The protected single-fiber passive optical network according to Claim 23, wherein the second interface is configured to switch off the second transmitter if the power level increases above the predetermined threshold value.

25. (Previously Presented) The protected single-fiber passive optical network according to Claim 23, wherein the second interface is configured to keep the second transmitter switched on if the power level increases above the predetermined threshold value.

26. (Previously Presented) The protected single-fiber passive optical network according to Claim 25, wherein the second interface is configured to switch the second transmitter off and again on to verify whether a degradation in power level of optical signals received from the first interface via the optical fiber is still detected.

27. (Previously Presented) The protected single-fiber passive optical network according to Claim 23, wherein the second interface is configured to switch off the second transmitter if the detector detects an abrupt change in the power level after switching on the second transmitter.

28. (Previously Presented) The protected single-fiber passive optical network according to Claim 27, wherein the second interface is configured to switch on the second transmitter again if the power level decreases below the predetermined threshold value.

29. (Previously Presented) A protected single-fiber passive optical network comprising:

a first interface including a first transmitter and a first receiver;

a second interface including a second transmitter and a second receiver;

an optical fiber connecting the first and second interfaces;

a plurality of passive nodes between the first and second interfaces;

a plurality of optical network units connected to the plurality of passive nodes; and

a detector at the second interface for detecting a degradation in power level of optical signals received from the first interface via the optical fiber;

wherein, in response to said detecting, the second interface is configured to switch on the second transmitter; and

wherein if the first and second interfaces are located in a single optical line terminal, the second interface is further configured to:

start an auto-discovery process to register affected optical network units; and

update an internal routing table of the optical line terminal in response to the result of the auto-discovery process.

30. (Withdrawn) The protected single-fiber passive optical network according to Claim 22, wherein if the first and second interfaces are located in different optical line terminals, the second interface further includes:

starting means for starting an auto-discovery process to register affected optical network units;

establishing means for establishing a dedicated path between the first and second interfaces;

sending means for sending a notifying message to the first interface, wherein the notifying message comprises information about the affected optical network units; and

forwarding means for forwarding the affected upstream traffic from the affected optical network units to the first interface via the dedicated path;

wherein the first interface comprises forwarding means for forwarding the downstream traffic of the affected optical network units to the second interface via the dedicated path; and

wherein the second interface comprises forwarding means for forwarding the affected upstream traffic from the affected optical network units to the first interface via the dedicated path.

31. (Withdrawn) The protected single-fiber passive optical network according to Claim 29, wherein the first interface further includes sending means for sending, to the second interface via the dedicated path, and indication of which higher layer addresses are behind the affected optical network units.

32. (Withdrawn) The protected single-fiber passive optical network according to Claim 31, wherein the second interface further comprises:

checking means for checking whether a destination address of a received packet is found in a routing table of an optical line terminal comprising the second interface; and

sending means for sending the packet according to the routing table if the destination address is found in the routing table, and if the destination address is not found in the routing table, sending the packet from the second interface to the first interface via the dedicated path.

33. (Previously Presented) A protected single-fiber passive optical network, comprising:

a first interface including a first transmitter and a first receiver;

a second interface including a second transmitter and a second receiver;

an optical fiber connecting the interfaces;

a plurality of passive nodes between the first and second interfaces;

a plurality of optical network units connected to the plurality of passive nodes;

detecting means for detecting that signals are not received at the first interface from at least one optical network unit;

means for starting an auto-discovery process to register the at least one optical network unit; and

sending means for sending, to the second interface, a message to switch on the second interface.

34. (Previously Presented) The protected single-fiber passive optical network according to Claim 33, wherein the second interface is configured to switch off the second transmitter of the second interface if the detecting means detects that a number of optical network units from which signals are not received increases.

35. (Previously Presented) A protected single-fiber passive optical network comprising:

a first interface including a first transmitter and a first receiver;

a second interface including a second transmitter and a second receiver;

an optical fiber connecting the first and second interfaces;

a plurality of passive nodes between the first and second interfaces;

a plurality of optical network units connected to the plurality of passive nodes;

detecting means for detecting that signals are not received at the first interface from at least one optical network unit; and

sending means for sending to the second interface a message to switch on the second interface;

wherein if the first and second interfaces are located in a single optical line terminal, the second interface further comprises:

starting means for starting an auto-discovery process to register affected optical network units; and

updating means for updating an internal routing table of the optical line terminal in response to the result of the auto-discovery process.

36. (Withdrawn) The protected single-fiber passive optical network according to Claim 33, wherein if the first and second interfaces are located in different optical line terminals:

the first interface comprises establishing means for establishing a dedicated path between the first and second interfaces;

the second interface comprises starting means for starting an auto-discovery process to register affected optical network units;

the second interface comprises sending means for sending a notifying message to the first interface, wherein the notifying message comprises information about the affected optical network units;

the first interface comprises forwarding means for forwarding downstream traffic of the affected optical network units to the second interface via the dedicated path; and

said second interface comprises forwarding means for forwarding affected upstream traffic from the affected optical network units to the first interface via the dedicated path.

37. (Withdrawn) The protected single-fiber passive optical network according to Claim 36, wherein the first interface further comprises sending means for sending, to the second interface via the dedicated path, an indication of which higher layer addresses are behind the affected optical network units.

38. (Withdrawn) The protected single-fiber passive optical network according to Claim 37, wherein the second interface further comprises:

checking means for checking whether a destination address of a received packet is found in a routing table of an optical line terminal associated with the second interface; and

sending means for sending the packet according to the routing table if the destination address is found in the routing table, and for sending the packet from the second interface to the first interface via the dedicated path if the destination address is not found in the routing table.

39. (Currently Amended) An interface apparatus for a protected single-fiber passive optical network, the interface apparatus comprising:

a first interface including a first transmitter coupled to a fiber for transmitting optical signals on a first wavelength, and a first receiver coupled to the fiber for receiving optical signals on a second wavelength;

a second interface including a second transmitter coupled to the fiber for transmitting optical signals on the second wavelength, and a second receiver coupled to the fiber for receiving optical signals on the first wavelength;

detecting means for detecting that optical signals are not received from at least one optical network unit;

means for measuring round trip delays between the second interface and optical network units attached to the second interface;

means for synchronizing at least some of the plurality of optical network units with the second interface; and

sending means for sending to the second interface a message to switch on the second interface.

40. (Previously Presented) The interface apparatus according to Claim 39, wherein the second interface is configured to switch off the second transmitter of the second interface if the detecting means detects that a number of optical network units from which signals are not received increases.

41. (Previously Presented) An interface apparatus for a protected single-fiber passive optical network, the interface apparatus comprising:

a first interface including a first transmitter coupled to a fiber for transmitting optical signals on a first wavelength, and a first receiver coupled to the fiber for receiving optical signals on a second wavelength;

a second interface including a second transmitter coupled to the fiber for transmitting optical signals on the second wavelength, and a second receiver coupled to the fiber for receiving optical signals on the first wavelength;

detecting means for detecting that optical signals are not received from at least one optical network unit; and

sending means for sending to the second interface a message to switch on the second interface,

wherein if the first and second interfaces are located in a single optical line terminal, the second interface further comprises:

starting means for starting an auto-discovery process to register affected optical network units; and

updating means for updating an internal routing table of the optical line terminal in response to a result of the auto-discovery process.

42. (Withdrawn) The interface apparatus according to Claim 39, wherein if the first and second interfaces are located in different optical line terminals:

the first interface comprises establishing means for establishing a dedicated path between the first and second interfaces;

the second interface comprises starting means for starting an auto-discovery process to register affected optical network units;

the second interface comprises sending means for sending a notifying message to the first interface, the notifying message comprising information about the affected optical network units;

the first interface comprises forwarding means for forwarding downstream traffic of the affected optical network units to the second interface via the dedicated path; and

the second interface comprises forwarding means for forwarding affected upstream traffic from the affected optical network units to the first interface via the dedicated path.

43. (Withdrawn) The interface apparatus according to Claim 42, wherein the first interface further comprises means for sending, to the second interface via the dedicated path, an indication of which higher layer addresses are behind the affected optical network units.

44. (Withdrawn) The interface apparatus according to Claim 43, wherein the second interface comprises:

checking means for checking whether a destination address of a received packet is found in a routing table of an optical line terminal associated with the second interface;

sending means for sending the packet according to the routing table if the destination address is found in the routing table, and for sending the packet from the second interface to the first interface via the dedicated path if the destination address is not found in the routing table.

45. (Previously Presented) An interface apparatus for a protected single-fiber passive optical network, the interface apparatus comprising:

a first interface including a first transmitter coupled to a fiber for transmitting optical signals on a first wavelength, and a first receiver coupled to the fiber for receiving optical signals on a second wavelength;

a second interface including a second transmitter coupled to the fiber for transmitting optical signals on the second wavelength, and a second receiver coupled to the fiber for receiving optical signals on the first wavelength; and

a detector coupled to the fiber for detecting a degradation in power level of incoming optical signals of the first wavelength via the fiber,

wherein the second interface is configured to synchronize at least some of the optical network units with the second interface, to measure a round trip delay between the second interface and its attached optical network units, and to conduct round trip delay compensation, and wherein in response to said detecting, the second interface is further configured to switch on the second transmitter.

46. (Previously Presented) The interface apparatus according to Claim 45, wherein the second interface is configured to switch on the second transmitter when the power level of the received optical signals of the first wavelength drops below a predetermined threshold value.

47. (Previously Presented) The interface apparatus according to Claim 46, wherein the second interface is configured to switch off the second transmitter if the power level increases above the predetermined threshold value.

48. (Previously Presented) The interface apparatus according to Claim 46, wherein the second interface is configured to keep the second transmitter switched on if the power level increases above the predetermined threshold value.

49. (Previously Presented) The interface apparatus according to Claim 48, wherein the second interface is configured to switch the second transmitter off and again on to verify that a cable is still broken.

50. (Previously Presented) The interface apparatus according to Claim 46, wherein the second interface is configured to switch off the second transmitter if the detector detects an abrupt change in an amount of light after switching on the second transmitter.

51. (Previously Presented) The interface apparatus according to Claim 50, wherein the second interface is configured to switch the second transmitter on again if the amount of light decreases below the predetermined threshold value.

52. (Previously Presented) The interface apparatus according to Claim 45, wherein if the first and second interfaces are located in a single optical line terminal, the second interface comprises

starting means for starting an auto-discovery process to register affected optical network units; and

updating means for updating an internal routing table of the optical line terminal in response to a result of the auto-discovery process.

53. (Withdrawn) The interface apparatus according to Claim 45, wherein if the first and second interfaces are located in different optical line terminals:

the second interface comprises starting means for starting an auto-discovery process to register affected optical network units;

the second interface comprises establishing means for establishing a dedicated path between the interfaces;

the second interface comprises sending means for sending a notifying message to the first interface, the notifying message comprising information about the affected optical network units;

the first interface comprises forwarding means for forwarding downstream traffic of the affected optical network units to the second interface via the dedicated path; and

the second interface comprises forwarding means for forwarding affected upstream traffic from the affected optical network units to the first interface via the dedicated path.

54. (Withdrawn) The interface apparatus according to Claim 53, wherein the first interface further comprises sending means for sending, to the second interface via the dedicated path, an indication of which higher layer addresses are behind the affected optical network units.

55. (Withdrawn) The interface apparatus according to Claim 54, wherein the second interface further comprises:

checking means for checking whether a destination address of a received packet is found in a routing table of an optical line terminal associated with the second interface; and

means for sending the packet according to the routing table if the destination address is found in the routing table, and for sending the packet from the second interface to the first interface via the dedicated path if the destination address is not found in the routing table.

56. (Canceled)

57. (Currently Amended) The method according to claim [[56]] 5, further comprising conducting round trip delay compensation at the second interface.